CLAIMS

What is claimed is:

1. A method of manufacturing a measuring wheel for wireline operations, comprising the steps of:

machining the perimeter of a metal wheel to achieve a first outer radius;

positioning the metal wheel within a ceramic ring having an inner radius that exceeds the first outer radius by an amount in the range of 0.005 to 0.010 inches, defining a gap between the ceramic ring and the metal wheel;

substantially filling the gap with an epoxy;

curing the epoxy to adjoin the ceramic ring to the metal wheel; and

machining the perimeter of the ceramic ring to achieve a second outer radius.

2. The method of claim 1, wherein the metal wheel is part of a spent measuring wheel.

3. The method of claim 2, wherein the first outer radius is achieved by machining the perimeter of the spent measuring wheel part to eliminate nonuniform areas produced by wear.

4. The method of claim 3, wherein the first outer radius is achieved by machining the perimeter of a spent measuring wheel part to reduce its outer radius by an amount in the range of 0.060 to 0.100 inches.

5. The method of claim 1, wherein the step of machining the perimeter of a metal wheel achieves a surface finish at the perimeter of the metal wheel in the range of 32 to 125 rms.

6. The method of claim 1, wherein the ceramic ring includes one of zirconium oxide, aluminum oxide, and silicon nitride.

7. The method of claim 1, wherein the epoxy is electrically insulating and has a relatively high coefficient of thermal expansion.

8. The method of claim 1, wherein the epoxy is cured at standard temperature and pressure for a period of twenty-four hours.

9. The method of claim 1, wherein the step of machining the perimeter of the ceramic ring achieves a surface finish at the perimeter of the ceramic ring in the range of 32 to 64 rms.

10. The method of claim 1, wherein the step of machining the perimeter of the ceramic ring achieves a patterned surface finish at the perimeter of the ceramic ring.

11. The method of claim 1, further comprising the step of adding a wear indicator to the perimeter of the ceramic ring.

12. The method of claim 1, wherein the step of adding the wear indicator includes the steps of:

forming at least one groove across the perimeter of the ceramic ring, the groove having a depth corresponding to acceptable wear of the ceramic ring and being substantially parallel to the axis of the ceramic ring, and

applying a dye to the bottom of the groove, such that wear of the ceramic ring exceeding the depth of the groove will be indicated by the elimination of the dye.

13. The method of claim 12, wherein the depth of the groove is approximately 0.010 inches.

14. The method of claim 12, wherein the groove is approximately 0.125 inches wide.

15. The method of claim 1, wherein the step of adding the wear indicator includes the steps of:

forming at three grooves 120 degrees apart across the perimeter of the ceramic ring, the grooves each having a depth corresponding to acceptable wear of the ceramic ring and being substantially parallel to the axis of the ceramic ring, and

applying a dye to the bottom of each of the grooves, such that wear of the ceramic ring exceeding the depth of the grooves will be indicated by the elimination of the dye.

16. A measuring wheel for use in wireline operations, comprising:

a metal wheel having a first outer radius;

a ceramic ring having an inner radius that exceeds the first outer radius by an amount in the range of 0.005 to 0.010 inches, defining a gap between the ceramic ring and the metal wheel when the two are concentrically arranged;

the ceramic ring having a perimeter whose surface employs:

a patterned machined finish for improving the frictional engagement between the perimeter of the ceramic ring and a wireline, and

a wear indicator; and

an epoxy disposed in the gap for adjoining the ceramic ring to the metal wheel.

17. The measuring wheel of claim 16, wherein the wear indicator of the ceramic ring includes at least one groove having a depth corresponding to acceptable wear of the ceramic ring and being substantially parallel to the axis of the ceramic ring.

18. The measuring wheel of claim 17, further comprising a dye applied to the bottom of the groove, such that wear of the ceramic ring exceeding the depth of the groove will be indicated by the elimination of the dye.

19. A measuring wheel for use in wireline operations, comprising:

a metal wheel having a first outer radius;

a ceramic ring having an inner radius that exceeds the first outer radius by an amount in the range of 0.005 to 0.010 inches, defining a gap therebetween; and

an epoxy disposed in the gap for adjoining the ceramic ring to the metal wheel;

the measuring wheel being characterized in that the ceramic ring has

a patterned surface finish machined on its perimeter, and

a wear indicator added to its perimeter.